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CENTRAL INTELLIGENCE AGENCY

REPORT [redacted]

INFORMATION REPORT

CD NO. [redacted] 25X1

COUNTRY	East Germany/USSR	DATE DIS[redacted]	15 August 1955
SUBJECT	VEB Funkwerk Koepenick Production of Hydroacoustic Equipment	NO. OF PAGES	10
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1. TEN 3, the hydroacoustics laboratory of Funkwerk Koepenick, was controlled by Harald Pessler and located at Plant 1 on 162 Wendenschloss Strasse, Berlin. TEN 3 had been established by Main Department Chief Dr. [redacted] in May 1951. TEN 4, the electroacoustics laboratory, was taken out of TEN 3 at a later date.[1]

2. Instruments developed by TEN 3 included an echo recording device (Echograph) with graphic indicator and a red lamp as optical indicator, and an echo sounding device with optical indicator. Both projects had been ordered by the State Planning Commission via HV RFT (Main Administration of Radio and Telecommunication Techniques) in early 1951. In January/February 1952, the first experiments were made with the optical indicator during a trip from Rostock to the Barents Sea as far as the pack-ice zone. The graphic indicator was tested in the same area in October 1952. The experimental series, including two echo sounding devices and two echo recording devices, were not tested before they were delivered to the Soviets. Both instruments were developed by Dipl Ing Reinhardt (fnu) and functioned satisfactorily during the experiments. Ing Kesten (fnu) developed several versions of the echograph which differed only slightly from each other. During the second half of 1954, an electric fish detector was developed as an auxiliary device. The development was based on the Monoscope, a product of the Atlas Firm in Bremen.

3. The development of the echographs and echo sounding devices was based on instrument No 8621.001-00001. This instrument had an impulse generator equipped with a 1 µF-condenser which, charged to a voltage of about 2 kV, discharged in the rhythm of the disc rotating in the indicator system via a low-resistance oscillator system of about 0.5 Ohm.

C-O-N-F-I-D-E-N-T-I-A-L

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The oscillator was composed of about 800 sheets of 96-percent pure nickel. These sheets were 01 mm thick and, in order to prevent eddy currents (Wirbelstroeme), they were oxidized at a temperature of 700 centigrade. The dimensions of the oscillators were designed for an ultrasonic frequency of 31.5 kc/s. In the indicator unit the echo picked up by the receiver oscillator was lead for a 10^6 time amplification to a resonance amplifier. The first two stages, an EF 12- and an EF 13-type tube, were laid out as resonance amplifiers. The EF 13 facilitated an adjustment of the amplification by altering with the help of potentiometers [redacted] and the cathode voltage. Subsequently the frequency was [redacted] 5.5 kc/s by means of an oscillator frequency in an ECH 11 type tube. A final stage equipped with an EL 12 produced the voltage for the recorder and for a thyratron which caused the special indicator lamp of the optical indicator unit to glow. According to the standard system, a smaller disc with a slot rotated at 450 rpm in front of this glowing lamp for precision indication to a depth of 100 meters, and a larger disc rotated slower for rough indication. The sounding device was designed for three measuring ranges: 0-400m, 400-800 m and 800-1,200 m. The recorder operated according to the Atlas system with spark recording and the chart moving 100 mm/h. Although this speed of the chart proved to be too slow during the experiments, no modification was made. The window of the recorder could not be opened. The recorder paper for the echo recorder, developed by the Heidenau Papier Institut in 1953, has successfully been used since May 1954. The instrument had a power consumption of 250 Watts at a voltage of 220.

4. The three versions of the basic type No 8621.001, developed by late 1953 included:

8621.002-00001(echo sounding device)
8621.003-00001 and
8621.007-00001.

a. The echo sounding device, No 8621.002, had no recorder but was otherwise identical to the basic model, and had even the same measuring ranges.

b. The instrument No 8621.003 differed from the basic model only with regard to the speed of the recorder chart which could be adjusted to move either 200 mm or 900 mm per hour. Because of its considerably higher resolving power it could be used by all types of vessels. The instrument was equipped with a connection for an electronic sight with oscillographic indicator. An EL 12 was installed as terminal tube recorder. The window of the recorder could be opened to permit the entry of additional notes [redacted] on the recording chart. The development of this version was completed in September 1954. The measuring ranges were the same as the ones of the basic model.

c. Echo recording device No 8621.007 differed from the basic model in the following details: The final stage of the resonance amplifier was equipped with an EL-11 type tube. The depth measuring range from 1 to 1,200 meters was divided into 6 sub ranges each of 200 meters. The recorder chart moved 200 mm per hour and the speed of the recording pen was increased about 100 percent.

5. The electronic fish detector was copied from the Monoskop of the Atlas Firm in Bremen. The development order was received from Rostock Fischkombinat in the summer of 1954 and completed in October 1954. An experimental series of four instruments was scheduled to be completed by mid 1955. Series production was to be started subsequently. Funkwerk Koepenick equipped this instrument with tubes of the types EF 80, ECC 81, EF 85, EL 84 and EZ 80, while Atlas still used E xx 12 series. A serious shortage of funds hampered the production of the experimental series. The mass production could not be started on schedule in mid 1955 unless sufficient funds were provided immediately. The instrument was developed by the engineers Kesten, Rueffert and Mueller. The Braun tube had a vertical scale graduated for 25 meters, which could indicate any section of the total depth measuring range from 1 to 600 meters. An LB-8 type Braun tube was installed in the experimental model. This tube had been redeveloped by Funkwerk Erfurt, and an experimental series was to be produced in late December 1954. The electric data and the dimensions of the tube had allegedly not been changed. The 10-pole socket was made of plastic instead of glass. A biconvex lens 120 mm in diameter was installed forward of the picture screen. The shape (type) of impulses indicated the type of sea bottom.

6. A "Fischlupe" (fish viewing lens) was a redevelopment of the Fischlupe produced by the Elac Firm in Kiel and differed from the basic model only in some details and in the material. The oscillograph screen of the [redacted] instrument was about 250 mm in diameter, while the LB 8 tube produced by Funkwerk Erfurt had a screen [redacted] 160 mm in diameter, with a sensitivity of deflection of 011 mm per volt at an operating voltage of 2 kV. No other Braun tubes were available. The project was started in late 1953 and was completed with successful tests in October 1954. The experimental series of four instruments was to be delivered by the spring of 1955. Because of material and budget difficulties it was decided that the mass production should not be started before 1956. Roessler and his deputy Rueffert were in charge of this project.

7. In the Summer of 1953, Wasserstrassenbauamt (Construction Office for Water [redacted] Magdeburg and Soviet representatives ordered the development of an echo sounding device for very shallow waters which was to operate with saw-tooth type frequency. In September 1954 the experimental model was completed by Roessler and Rueffert. In inland waters the instrument was to detect precisely sandbanks, drift sand movements and to determine whether the bottom was drift sand or solid. The instrument was tested in the Berlin area in the presence of representatives of Wasserstrassenbauamt Magdeburg and the USSR. The experiments were successfully completed in late October 1954.

The instrument operated with a frequency of 48 kc/s on the principle that the arriving echo automatically effected a new transmitter impulse. The data obtained were indicated by an indicator instrument and by a recorder. The sounding device was designed for depths between 30 cm and 20 meters and operated with an accuracy of 10 cm. The production of a series of 30 or 40 units was to be started in early 1955. The plant expected a large production order from the Soviets.

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8. An order for the development of an omnidirectional echo sounding device was received from the Soviets and the KVP [redacted] in 1953. The development project was started in January 1954 and by November the plant was still involved in designing and drawing work. The experimental model was scheduled to be completed in 1959 and series production was to start subsequently. The device was copied from a omnidirectional echo sounding instrument of the former Kriegsmarine (German Navy). The new instrument w[redacted] smaller in dimensions and designed for the material now in use. [redacted] and other basic records of the Kriegsmarine were not [redacted] available. The confidential project had the cover designation K 94. Both, the Soviets and the KVP Sea had some special technical requirements which had not yet been fixed. Willi Engel, an impulse expert of the TET Department (Technical Development of Decimeter and Centimeter Instruments), was in charge of the project.

The instrument was to operate at a frequency of 15 kc/s and to make possible horizontal and vertical soundings to a maximum range of 8,000 meters. The oscillator was to be mounted in a group of four on a rotating periscope. The order for the development of the extending mechanism for the omnidirectional echo sounding device and for the construction of an experimental model had been received from WTB fuer Geraetebau (Scientific Technical Office for Instrument Construction) in Berlin in March 1954. Personnel problems hampered the development activities. EFEM (Development and Production of Electric Measuring Instruments) was allegedly also involved in the development of sounding devices.

9. In the spring of 1954, conferences at Funkwerk Koepenick were held with 3 to 5 representatives of the VP See from Stralsund and with experts from the plant. Some VP representatives wore civilian clothes. Funkwerk Koepenick was represented by Professor Pessler (fnu), Dr Weber, Roessler, Kersten and by Klein of the designing office. The subject handled during the conferences indicated that the VP [redacted] representatives were technically well trained and that they had good special knowledge in some fields. The last conference held in May 1954 was attended also by a representative of the Sea Hydrographic Service in Stralsund. The possibilities of constructing an echo sounding instrument for an experimental boat of aluminum which was under construction at a shipyard in Stralsund were discussed at the conferences. The VP See representatives stated that the hull was made of ALMG 5 type aluminum which was similar to the "Hydronal" used in aircraft production. The experts of Funkwerk Koepenick were shown a material sample. The aluminum plates for the sides and bottom of the hull were 5 mm thick. The keel of the boat was very flat. The echo sounding device was to be designed for lightweight construction of smallest dimensions for a measuring range from 50 cm to 400 meters. It was of primary importance that the oscillator be located in the hull in order to keep the stream line under any circumstances.

The experts of Funkwerk Koepenick stated that [redacted] lack of experience with this new type of oscillator in [redacted] (assembly), a comparatively long period would be required for the research activities. Furthermore various materials would have to be obtained from the West. When the VP [redacted] representatives gave October 1954 as the last possible target date, the order was turned down by the plant management on advice of the experts.

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10. As suggested by Laboratory TEN 3, an [redacted] request for the redevelopment of the PL 21 thyratron of the Phili[redacted] was turned over the the Werk fuer Fernmeldewesen (Plant of Tel[redacted]cations) in September 1954. This was done in order to speed the co[redacted]on to miniature-type construction. The funds were already approved. It was also planned to copy a "Sendytron" (sic) from a western model to replace the mechanical relay in an impulse generator. Mercury was to be used for the anode and cathode. The power was to be 300 amp at 2 kV.

11. Dipl Ing Hasler (fnu) worked on the development of oscillators for the purpose of analyzing the magnetostrictional properties of various materials and to produce an instrument to measure the absolute output of the oscillators. The Hermsdorf Ceramic Works supplied the barium titanate required for these activities.

12. The following development projects were handled by Laboratory TEN 4:

a. Seaworthy moving coil microphone for frequencies up to 7 kc/s. At 5 [redacted] kc/s the frequency curve showed a depression of 5 decibels. The microphone was similar to a reported microphone and equipped with a diaphragm of "Stiroflex" foil and a coil of 0.06 mm copper wire.

b. Switchable condenser microphone with electrically adjustable characteristics.
The microphone cited in paragraph "a", a development of Siegfried Riemann, was completed in October 1954 and subsequently tested at a broadcast. The sound engineers stated that this was the best microphone they knew of and that it was even better than Western products. The microphone was equipped with a gold foil.

c. Sounding device to measure the content of silos and bunkers, etc. The test model was completed in October 1954.

d. Train supervising device.

e. Crack detector to find material defects in sheets, etc, by means of a change in the magnetic field which in turn was indicated by a glow lamp. The development was completed in November 1954. A further development of the detector by Schoene was planned for 1955.

f. Tape recorder with very constant operation at a tape speed of 19 cm/s and with frequency spectrum.

g. Tape recorder for the modulation of SOS distress call devices.

h. Dictograph for blind persons. Experiments to use wire as sound carrier had failed.

13. The output of echo recorders and echo sounding devices amounted to:

Model 8621.001 echo recorders

1953: 60 sets for the USSR
10 sets for the Rostock and Sassnitz Fishing Combines

1954: 120 sets for Stralsund Volkswerft to be installed in luggers, trawlers etc for the USSR

10 sets for East German requirements

Model 8621.002 echo sounding devices

1953: about 70 sets for the USSR via Volkswerft Stralsund
2 sets for Rostock/Marienehe Fishing Combine

1954: 50 to 70 sets were delivered to the USSR
10 sets for the DDR were completed.

All instruments produced for the USSR were delivered with a spare parts kit containing 5 sets of all component parts, while the instruments for East German requirements had only one set of spare parts.

14. The 1955 production plan included:

30 echo recorders, model No 8621.003 for the Rostock and Sassnitz Fishing Combines

220 echo recorders, model No 8621.007, most of them probably for the USSR

100 echo sounding devices.

The electronic fish detector was to be produced by Plant II after November 1955. Four experimental instruments were to be sea tested.

15. All echo sounding devices had to meet the requirements of the Soviet Nautical Register (Seefahrtsregister). One especially important factor was that the Soviet Nautical Register did not permit the use of electrolytic condensers. All instruments had to be protected against water and to operate at a temperature range of 70° Centigrade above zero to 50° Centigrade below zero. Also required were special safety contacts, and additional specifications for the shafts of the potentiometers and the tube supports. All casings had to be produced of silumin.

16. The equipment of the TEN laboratories was complete and included many [redacted] new instruments of postwar production. The activities of the TEN 3 laboratory were handicapped by the lack of a test stand for impedance specially designed for magnetostrictional oscillators and the lack of a measuring boat for mobile tests. A test stand available at the Dahme river, was designed only for horizontal measurements to 960 meters. Further handicaps were the various temperatures of water layering which effected indication errors as a result of the refraction of the bundled ultrasonic ray. These partly serious difficulties made the plant management speed the completion of a measuring boat which was only half completed at a shipyard in Fuerstenberg/Oder by 3 November 1954. Although the boat was scheduled to be put into operation in the summer of 1954, it would probably not be completed before the fall of 1955.

17. A Chinese and a Korean commission visited the plant in mid-1954. The latter commission was presented with a complete set of an echo recording device and the first production model of a fish detector. The funds for this present had been made available by collections at the plant. Soviet commissions, mostly engineers, frequently visited the plant.

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18. The development projects were hampered considerably by supply difficulties. Even for simple single parts the delivery term was six months. Major difficulties were involved in the supply of the following parts:

high voltage condensers, 0.25 to 2µF for 2 to 6 KV
special miniature condensers of metallic paper and
220-V miniature motors; the were of poor quality
and the delivery terms 9 months

piezoelectrical material from the Hermsdorf Ceramics Plant

cathode ray tubes from the Plant of Telefunken and Funkwerk Erfurt, allegedly because of a shortage of molybdenum and tungsten.

19. Ing Walter Treusch and Ing Sieland (fnu) worked in the research department of the tumor of the Institute of Medicine and Biology of the DAdW (German Academy of Sciences) at Berlin Buch on the development of an electronic computing instrument. The instrument was to be equipped with tubes of the 80-type series of East German production and with tubes. An experimental model of the instrument was allegedly completed. 25X1

1. Comment. For table of organization and personnel of the plant and the TEN departments, see Annex. 25X1

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Table of Organization and Personnel of Funkwerk Koepenick, Especially 25X1

Department TEN for Low Frequency Techniques

25X1

A. Key Positions

Plant chief and commercial manager: Paul Boeer,

Technical manager: Walter

Plant I Development Department I

Development Department II for Measuring Instruments and Low Frequency Techniques.

Chief: Dr Heinrich Weber, 25X1

Plant II

Chief production: Ing Schmidt,

Production Department

Mechanical workshop: Stange (fnu)
Switching technical workshop: Krieger (fnu)
Quality control

Plant III to be transferred from Zernsdorf.

B. Table of Organization of Development Department II

TEN Department

Chief: Willi

Ing [redacted] 25X1 25X1

TEN 1, Amplifier Laboratory: Geissler and 5 assistants

TEN 2, Modulation Laboratory: [redacted] his assistants were Willi Rosen and two others

TEN 3, Hydroacoustical Laboratory: Ing Harald Peesler, 25X1

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Personnel of TEN 3

Deputy chief of laboratory, developer of echo recording devices:	Ing Alfred Kesten, 25X1
Competent for echo sounding device for small depths and for fish detectors:	Ing Roessler,
Oscillators:	Dipl Ing Gotthardt Hassler,
Omnidirectional echo sounding device:	Ing Willi Engel,
Echo sounding device for small depths and fish detector:	Ing Ernst Rueffert,
Echo recording device:	Ing Kurt Mueller.
Laboratory assistant	Hardt (fnu),
Switching mechanic	Alfred Calenius,
Chief mechanic	Kurt Drefke,
TEN 4, Electroacoustical Laboratory:	Ing Fritz Knochenhauer,

Personnel of TEN 4

Laboratory technician:	Heinz Kosmehl, 25X1
	Ing Heinz Lehmann,
Crack detector:	Ing Schoene (fnu), 25X1
Damping recorder:	Ing Gnabs (fnu),
Laboratory technician and competent expert for microphones:	Siegfried Riemann,
Mechanic:	Timpel (fnu),
Section chief and expert for bunker sounding device:	Ing Helmut Vorbrodt,
	Endolein (fnu)

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TEN 5, Quartz Laboratory: [redacted] 25X1

A laboratory workshop with 8 persons and the administration with three persons belonged also to the TEN Department. 25X1

TET Department

Chief: Heinz [redacted]

The department included laboratories, among others for television [redacted] telegraphy. [redacted] Electronic laboratory [redacted]. Heinz Guenther

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3. The development of the echographs and echo sounding devices was based on instrument No 8621.001-00001. This instrument had an impulse generator equipped with a 1 µF-condenser which, charged to a voltage of about 2 kV, discharged in the rhythm of the disc rotating in the indicator system via a low-resistance oscillator system of about 0.5 Ohm.

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The oscillator was composed of about 800 sheets of 96-percent pure nickel. These sheets were 01 mm thick and, in order to prevent eddy currents (Wirbelstroeme), they were oxidized at a temperature of 700°Centigrade. The dimensions of the oscillators were designed for an ultrasonic frequency of 31.5 kc/s. In the indicator unit the echo picked up by the receiver oscillator was lead for a 10^6 time amplification to a resonance amplifier. The first two stages, an EF 12- and an EF 13-type tube, were laid out as resonance amplifiers. The EF 13 facilitated an adjustment of the amplification by altering with the help of potentiometers the screem grid and the cathode voltage. Subsequently the frequency was changed to 5.5 kc/s by means of an oscillator frequency in an ECH 11 type tube. A final stage equipped with an EL 12 produced the voltage for the recorder and for a thyratron which caused the special indicator lamp of the optical indicator unit to glow. According to the standard system, a smaller disc with a slot rotated at 450 rpm in front of this glowing lamp for precision indication to a depth of 100 meters, and a larger disc rotated slower for rough indication. The sounding device was designed for three measuring ranges: 0-400m, 400-800 m and 800-1,200 m. The recorder operated according to the Atlas system with spark recording and the chart moving 100 mm/h. Although this speed of the chart proved to be too slow during the experiments, no modification was made. The window of the recorder could not be opened. The recorder paper for the echo recorder, developed by the Heidenau Papier Institut in 1953, has successfully been used since May 1954. The instrument had a power consumption of 250 Watts at a voltage of 220.

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c. Echo recording device No 8621.007 differed from the basic model in the following details: The final stage of the resonance amplifier was equipped with an EL-11 type tube. The depth measuring range from 1 to 1,200 meters was divided into 6 sub ranges each of 200 meters. The recorder chart moved 200 mm per hour and the speed of the recording pen was increased about 100 percent.

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The experts of Funkwerk Koepenick stated that, in view of the lack of experience with this new type of oscillator installation (assembly), a comparatively long period would be required for the research activities. Furthermore various materials would have to be obtained from the West. When the VP See representatives gave October 1954 as the last possible target date, the order was turned down by the plant management on advice of the experts.

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c. Sounding device to measure the content of silos and bunkers, etc. The test model was completed in October 1954.

d. Train supervising device.

e. Crack detector to find material defects in sheets, etc, by means of a change in the magnetic field which in turn was indicated by a glow lamp. The development was completed in November 1954. A further development of the detector by Schoene was planned for 1955.

f. Tape recorder with very constant operation at a tape speed of 19 cm/s and with frequency spectrum.

g. Tape recorder for the modulation of SOS distress call devices.

h. Dictograph for blind persons. Experiments to use wire as sound carrier had failed.

13. The output of echo recorders and echo sounding devices amounted to

<u>Model 8621.001 echo recorders</u>

1953: 60 sets for the USSR
10 sets for the Rostock and Sassnitz Fishing Combines

1954: 120 sets for Stralsund Volkswerft to be installed in luggers, trawlers etc for the USSR

10 sets for East German requirements

Model 8621.002 echo sounding devices

1953: about 70 sets for the USSR via Volkswerft Stralsund
2 sets for Rostock/Marienehe Fishing Combine

1954: 50 to 70 sets were delivered to the USSR
10 sets for the DDR were completed.

All instruments produced for the USSR were delivered with a spare parts kit containin, 5 sets of all component parts, while the instruments for East German requirements had only one set of spare parts.

14. The 1955 production plan included:

30 echo recorders, model No 8621.003 for the Rostock and Sassnitz Fishing Combines

220 echo recorders, model No 8621.007, most of them probably for the USSR

100 echo sounding devices.

The electronic fish detector was to be produced by Plant II after November 1955. Four experimental instruments were to be sea tested.

15. All echo sounding devices had to meet the requirements of the Soviet Nautical Register (Seefahrtsregister). One especially important factor was that the Soviet Nautical Register did not permit the use of electrolytic condensers. All instruments had to be protected against water and to operate at a temperature range of 70°Centigrade above zero to 50° Centigrade below zero. Also required were special safety contacts, and additional specifications for the shafts of the potentiometers and the tube supports. All casings had to be produced of silumin.

16. The equipment of the TEN laboratories was complete and included many new instruments of postwar production. The activities of the TeN 3 laboratory were handicapped by the lack of a test stand for impedance specially designed for magnetostrictional oscillators and the lack of a measuring boat for mobile tests. A test stand available at the Dahme river, was designed only for horizontal measurements to 960 meters. Further handicaps were the various temperatures of water layering which effected indication errors as a result of the refraction of the bundled ultrasonic ray. These partly serious difficulties made the plant management speed the completion of a measuring boat which was only half completed at a shipyard in Fuerstenberg/Oder by 3 November 1954. Although the boat was scheduled to be put into operation in the summer of 1954, it would probably not be completed before the fall of 1955.

17. A Chinese and a Korean commission visited the plant in mid-1954. The latter commission was presented with a complete set of an echo recording device and the first production model of a fish detector. The funds for this present had been made available by collections at the plant. Soviet commissions, mostly engineers, frequently visited the plant.

18. The development projects were hampered considerably by supply difficulties. Even for simple single parts the delivery term was six months. Major difficulties were involved in the supply of the following parts:

high voltage condensers, 0.25 to 2 µF for 2 to 6 kV
special miniature condensers of metallic paper and Silan
220-V miniature motors; the brushes were of poor quality
and the delivery terms 9 months

piezoelectrical material from the Hermsdorf Ceramics Plant

cathode ray tubes from the Plant of Telecommunications and Funkwerk Erfurt, allegedly because of a shortage of molybdenum and tungsten.

19. Ing Walter Treusch and Ing Sieland (fnu) worked in the research department of the tumor clinic of the Institute of Medicine and Biology of the DAdW (German Academy of Sciences) at Berlin Buch on the development of an electronic computing instrument. The instrument was to be equipped with tubes of the 80-type series of East German production and with West German tubes. An experimental model of the instrument was allegedly completed.

1. [redacted] Comment. For table of organization and personnel of the plant and the TEW departments, see Annex.

25X1

Table of Organization and Personnel of Funkwerk Koepenick, Especially Department TEN for Low Frequency Techniques

A. Key-Positions

Plant chief and commercial manager: Paul Boeer, [redacted] 25X1

Technical manager: Walter Heine, [redacted]

Plant I Development Department I

Development Department II for Measuring Instruments and Low Frequency Techniques.

Chief: Dr Heinrich Weber, [redacted] 25X1

Plant II

Chief production: Ing Schmidt, [redacted]

Production Department

Mechanical workshop: Stange (fnu)
Switching technical workshop: Krieger (fnu)
Quality control

Plant III to be transferred from Zernsdorf.

B. Table of Organization of Development Department II

TEN Department

Chief: Ing Willy Geissler, [redacted] 25X1
25X1

TEN 1, Amplifier Laboratory: Geissler and 5 assistants

TEN 2, Modulation Laboratory: Kurt Güldenpfennig [redacted] 25X1
his assistants were Willi Rosen and two others

TEN 3, Hydroacoustical Laboratory: Ing Harald Pessler, [redacted] 25X1
25X1

25X1

Personnel of TEN 3

Deputy chief of laboratory, developer of echo recording devices:	Ing Alfred Kesten,
Competent for echo sounding device for small depths and for fish detectors:	Ing Roessler,
Oscillators:	Dipl Ing Gotthardt Hassler,
Omnidirectional echo sounding device:	Ing Willi Engel,
Echo sounding device for small depths and fish detector:	Ing Ernst Rueffert,
Echo recording device:	Ing Kurt Mueller,
Laboratory assistant	Hardt (fnu),
Switching mechanic	Alfred Calenius,
Chief mechanic	Kurt Drefke,
TEN 4, Electroacoustical Laboratory:	Ing Fritz Knochenhauer,

Personnel of TEN 4

Laboratory technician:	Heinz Kosmehl,
	Ing Heinz Lehmann,
Crack detector:	Ing Schoene (fnu),
Damping recorder:	Ing Gnabs (fnu),
Laboratory technician and competent expert for microphones:	Siegfried Riemann,
Mechanic:	Timpel (fnu),
Section chief and expert for bunker sounding device:	Ing Helmut Vorbrodt,
	Endolein (fnu)

25X1

25X1

TEN 5, Quartz Laboratory: Ing Scheil, 25X1

A laboratory workshop with 8 persons and the administration with three persons belonged also to the TEN Department.

25X1

TET Department

Chief: Heinz Dobesch,

The department included laboratories, among others, for television control installations and impulse oscillographs. Hans Fleischer and Klaus-Guenter Ebert were laboratory chiefs. 25X1

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